REMARKS

Applicant gratefully acknowledges the brief telephonic interview granted by the Examiner on April 12th, 2004 with Jonathan Hallman. In that interview, the definitions of what Applicant has denoted as "first-surface" and "second-surface" optical disks was discussed. In a second-surface disk, the information layer is covered by a relatively-thick transparent layer. Because the information layer is covered by a relatively thick transparent layer, typically at least 50 wavelengths in thickness or more with respect to the wavelength of the laser beam that will be used to read/write the information layer, the thick transparent layer then acts to defocus dust particles lying on its surface with respect to the information layer. But this thick layer acts to introduce optical aberrations that are undesirable in the miniaturization of both the optical disk and the related optical head used to read/write to the optical disk. As such, the present assignee has invented and claimed "first-surface" optical disks that do not include this thick overlaying transparent layer. Instead, dust particles are not defocused but must be dealt with using ECC alone.

As stressed in the interview, the Luecke reference is plainly a second-surface disk as it describes the use of both a 1.2 mm thick transparent layer and a 0.6 mm transparent layer. Both those thicknesses are many wavelengths of laser light in thickness and thus both serve to defocus surface imperfections such as dust. Luecke indeed recognizes this by stating (with respect to the 1.2 mm thickness) "[s]urface defects or contamination on the cover plate do not normally introduce errors because they are not in the focal plane of the objective lens in the optical head." (Col. 1., lines 50-53). If something is removed from the focal plane, it is defocused – thus, Luecke expressly recognizes the "second-surface" function of the relatively-thick transparent layer to defocus dust particles and other surface imperfections with respect to the underlying information layer. Accordingly, it was respectfully stressed at the interview that the Examiner had misinterpreted the Luecke reference as disclosing a first-surface optical disk.

In response, the Examiner indicated that the attorney's arguments were noted but that he would need further evidence regarding the differences between second-surface and first-surface disks. In particular, the Examiner asked for a Rule 132 affidavit regarding these differences and also the differences between Applicant's claimed subject matter and the prior art. Accordingly, Applicant encloses the affidavit of David H. Davies, PhD. As held by the U.S. Supreme Court in Graham v. John Deere, 148 USPQ 459 (1966), an obviousness

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analysis requires that "[1] the scope and content of the prior art are to be determined; [and] [2] differences between the prior art and the claims at issue are to be ascertained." The affidavit of Dr. Davies is provided to assist the Examiner with respect to these two categories. As can be seen from the testimony of Dr. Davies, he is an expert in the optical disk arts, having been elected a fellow in the SPIE (the optical engineering society) among other achievements.

Dr. Davies testimony may be summarized as follows:

Dr. Davies testified about the dust and other contamination a removable optical disk will always be subject to. Dr. Davies testified as to the common practice of using a relatively thick layer of transparent material such as polycarbonate to overlay an optical disk's information layer to combat the effects of dust and other surface contaminations. Dr. Davies testified that this relatively thick transparent layer acts to defocus surface imperfections with respect to an optical disk drive head that is focusing on the underlying information layer. Dr. Davies testified that such disks were denoted as "second-surface" optical disks.

Dr. Davies testified that the prior art cited against the pending claims of the present application are all directed to the use of second-surface disks.

Dr. Davies testified that second-surface disks introduce aberrations that limited the achievable miniaturization of data features on the information layer. Dr. Davies testified about the development of a portable optical disk drive system at Dataplay in which a reduced disk dimension was desired. Dr Davies testified that because of the limits on miniaturization in second-surface disks, Dataplay desired to develop a first-surface disk that did not include a relatively-thick transparent layer that acted to defocus dust and other surface imperfections, but that an optical system using such a first-surface disk would then suffer from the effects of the dust. Dr. Davies testified that the inventor of the present application addressed this problem by developing a first-surface disk having a robust ECC block.

Applicant respectfully submits that the enclosed Rule 132 affidavit thus assists the Examiner with respect to the two categories of inquiry established by the U.S. Supreme Court described above. Namely, the testimony of Dr. Davies has provided evidence for the Examiner to consider regarding the fundamental differences between first-surface disks and second-surface disks. Furthermore, the testimony of Dr. Davies has provided evidence regarding the interpretation of the cited prior art – that this cited prior art merely discloses the use of second-surface optical disks, a use that the Applicant admits is abundantly in the prior art.

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Based upon the testimony of Dr. Davies, Applicant respectfully submits that the Examiner has misinterpreted the Luecke reference as disclosing a first-surface disk. As discussed above, Luecke instead discloses a second-surface disk. In particular, Applicant vigorously traverses the Examiner's assertion that first-surface optical disks are in wide use. Instead, Dr. Davies testifies that, with the exception of the present assignee's disks, all commercially-available optical disks are second-surface disks. The invention claimed in the present application enabled this exception.

To reiterate, although the present assignee advanced the optical arts through the use of first-surface optical disks, conventional ECC blocks proved to be problematic in these first-surface optical disks. These conventional ECC blocks were optimized for the older, second-surface disks having the conventional CD-ROM /DVD size. When used in miniaturized first-surface optical disks, dust particles could cause multiple burst errors in these conventional ECC blocks as shown in Figure 1. Not only were the chances of burst errors increased, the degree of redundancy to provide the necessary ECC was not enough given that dust particles were no longer defocused. Accordingly, Applicant has invented the embodiment recited in claim 16: namely a first-surface optical disk having "an information layer, and a transparent layer overlaying the information layer, wherein the thickness of the transparent layer with respect to the wavelength of the read/write laser beam is such that dust particles on the surface of the transparent layer are not defocused when reading data from the information layer with the laser beam passing through the transparent layer." In this first surface disk, the information layer organized into ECC blocks, "each ECC block forming an array of 104 rows and 182 columns of bytes, each row including ten bytes of inner parity and each column including sixteen bytes of outer parity." But note that use of such an ECC block would be contraindicated in second-surface disks – the claimed ECC block increases redundancy and thus reduces the available storage space. Thus, it cannot be divorced from the first-side disk limitation but must be considered with the first-side limitation as a whole.

Applicant respectfully submits that claim 16 is allowable over the Nakatsuji reference (USP 6,332,206). Indeed, the only optical disk discussed in the Nakatsuji reference is a DVD-ROM, a well-known second-surface disk. See, e.g., Col. 23, line 29. In the present application, however, what Applicant is claiming is a first-surface disk having an ECC block specialized for the particular circumstances encountered in a first-surface environment. Nakatsuji is entirely silent regarding such a novel creation. Accordingly, claim 16 is patentable over this reference.

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The DVD standard cited by the Examiner adds nothing further as it teaches a conventional second-surface ECC block size.

Because claims 17 through 20 depend either directly or indirectly upon claim 16, they are patentable for at least the same reasons.

Claim 21 claims another type of first-surface disk also discussed by the Applicant on, e.g., page 6, lines 14 through 30. In this embodiment, no transparent layer covers the information layer (although the transparent layer claimed in claim 16 cannot defocus dust particles, it may help optically couple the laser beam to the information layer). As such claim 21 is patentable over the art of record for the same reasons discussed with respect to claim 16 (the ECC block limitations being the same).

Because claims 22 and 23 depend either directly or indirectly upon claim 21, they are patentable for at least the same reasons.

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CONCLUSION

For the above reasons, pending Claims 16 through 24 are in condition for allowance and allowance of the application is hereby solicited. If the Examiner has any questions or concerns, a telephone call to the undersigned at (949) 752-7040 is welcomed and encouraged.

I hereby certify that this correspondence is being facsimile transmitted to (703) 872-9306: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on April 19, 2004.

Eric Hoover — April 19, 2004 Date of Signature

Respectfully submitted,

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